(19) Japanese Patent Office

(11) Publication Number
5-33335

(12) THE UTILITY MODEL GAZETTE (Y2)

(51)Int.Cl.[5]	Identification code	Office File Numbers	(24)(44) Publication date 25th Aug. 1993
B 32 B	27/12	7258-4F	
	3/14	7016-4F	
	27/30 101	8115-4F	

(Total 3 sheets)

---

(54) Title of the device: A waterproof material with outstanding apparel characteristics

(21) Application number: 62-63407 (63407-1987)

(22) Application date: 28th April 1987

(65) Laid-open number: 63-170224 (170224-1988)

(43) Laid-open date: 7th November 1988

(72) Deviser: N. Ishimaru
Ho-160 Kamikitano-cho
Fukui-shi
Fukui-ken

(71) Applicant: Seiren K.K.
1-10-1 Keya
Fukui-shi
Fukui-ken

(74) Agent: T. Saito, Patent Attorney
(plus 1 other)

Examiner: M. Kobayashi

(57) Scope of Utility Model Claims

1 A waterproof material with outstanding apparel characteristics which is formed by providing a waterproof layer comprising a polyurethane resin on the surface of a fabric via an adhesive agent layer and, furthermore, providing a discontinuous layer of vinyl chloride resin projections/indentations on the surface of said waterproof layer, of height 0.03 to 0.3 mm and of printed area no more than 50%.

2 A waterproof material according to Claim 1 where the adhesive agent layer comprises a polyacrylate resin adhesive or a polyurethane resin adhesive.

3 A waterproof material according to Claims 1 or 2 where the polyurethane resin of the waterproof layer is an amino acid-modified polyurethane resin.

4 A waterproof material according to any of Claims 1 to 3 where the adhesive agent layer and the waterproof layer are moisture-permeable.

Detailed Description of the Utility Model

This utility model relates to a waterproof material; more particularly, it relates to a waterproof material with outstanding apparel characteristics where the face in contact with the skin has the form of projections/indentations and which possesses moisture permeability.

At present, the waterproof materials which are normally used are primarily those where the undersurface of a base material is coated with a polyacrylate ester resin,

a polyurethane resin, a polyethylene resin, a chloroprene resin, a polyvinyl chloride resin or the like, and when sewing together clothes using such a waterproof material, in high-grade products there is provided a lining, while in ordinary products it is normal to leave the coated face exposed.

However, in the latter case, a marked sultry or sweaty state arises as a result of the perspiration produced at the time of wearing and an uncomfortable feel is imparted, so recently attempts have been made to overcome such problems by developing and employing on a practical basis a waterproof material which is also moisture permeable. However, while a tentative effect is to be had in the case of light motion, when motion is marked the amount of perspiration produced is considerable, so there is the disadvantage of an extremely uncomfortable feel, in particular when there is marked condensation of perspiration on the coated resin face and contact between the skin and the wet resin face takes place when the waterproof clothes are removed. Thus, a comfortable waterproof material is demanded where such problems are resolved.

The objective of the present utility model lies in offering a waterproof material which does not have an unpleasant feel even when the skin comes into contact with the coated face where perspiration has condensed.

The present inventor has carried out a painstaking investigation to overcome the aforesaid disadvantages of waterproof materials and, as a result, has devised an extremely effective utility model.

Specifically, this utility model is a waterproof material with excellent apparel characteristics which is formed by providing a waterproof layer comprising a polyurethane resin on the surface of a fabric via an adhesive agent layer and, furthermore, providing a discontinuous layer of vinyl chloride resin projections/indentations on the surface of said waterproof layer, of height from 0.03 to 0.3 mm and of printed area no more than 50%.

Below, the waterproof material of the present utility model is explained by means of the appended drawing.

Figure 1 shows an example of the waterproof material according to the present utility model, where **1** is a knitted or woven fabric comprising mixed-spun synthetic fibre and other fibre, and on the undersurface of said fabric there is provided a waterproof layer **3** via an adhesive agent layer **2** and, furthermore, there is in turn formed a layer **4** of projections/indentations on the surface of said waterproof layer.

The adhesive agent layer **2** is obtained by applying a polyacrylate ester resin or a polyurethane resin, and it lies between the base material **1** and waterproof layer **3** and serves to improve the adhesion there-between. Said waterproof layer **3** comprises a polyurethane resin (which may also be an amino acid-modified polyurethane resin or the like) to which various types of colouring agents and fillers have been added, and it serves to prevent water from penetrating from the outside.

Waterproof materials of the aforesaid structure are already known, and the chemical composition of the

polyurethane resin forming the waterproof layer used can be suitably selected from those resins already employed in polyurethane resin waterproof materials of the laminate type. Specifically, there can be used, as the adhesive agent layer and as the waterproof layer, a layer which is formed by carrying out application to the base material of a resin solution comprising polyurethane resin or amino acid-modified polyurethane resin dissolved in dimethylformamide, after which the dimethylformamide is extracted into water to form a microporous coated film, or alternatively there is used an emulsion liquid of polyurethane resin and this then subjected to a drying method to form a microporous coated film.

The characteristic feature of the present utility model is that, on the polyurethane resin layer which has been adhesion-laminated as described above, polyvinyl chloride resin is affixed in the form of a layer **4** of discontinuously-formed projections/indentations of height from 0.03 to 0.3 mm and of printed area no more than 50%. This layer of projections/indentations **4** is preferably formed by printing, such as by gravure printing, but the method of applying a vinyl chloride resin in which is mixed a blowing agent which releases nitrogen gas or the like, and then heating to bring about blowing, can also be used insofar as the conditions of height and printed area specified in this utility model are satisfied.

As the polyvinyl chloride resin, a so-called paste resin comprising polyvinyl chloride powder dispersed in a plasticizer is ideal but there can also be used an organosol, or the like, where mineral terpene is added.

Where the printed area of the layer of projections/indentations **4** is too large, or the height of the projections too low, the resin area from which the layer of projections/indentations is composed will be too flat and the effects obtained are markedly lowered, so such cases lie outside of the present utility model. Thus, from this point of view, the printed area will be no more than 50% and preferably 5 to 20%, while the height of the projections will be 0.05 to 0.3 mm and preferably 0.1 to 0.2 mm.

By providing the vinyl chloride resin on the polyurethane resin waterproof layer in the form of a layer of projections/indentations as stated above, there is the effect that, as well as being endowed with the inherent functions of the waterproof material, the apparel characteristics and durability are also outstanding.

Consequently, the printed area is appropriately no more than 50% and preferably 5 to 20%, and the height of the projections is appropriately 0.05 to 0.3 mm and preferably 0.1 to 0.2 mm.

Now, with regard to the aforesaid adhesive agent layer or waterproof layer, by employing a layer which is formed by carrying out application to the base material of a resin solution comprising a polyurethane resin or amino acid-modified polyurethane resin dissolved in dimethylformamide, after which the dimethylformamide is extracted into water to form a microporous coated film, or, alternatively, by using an emulsion liquid of polyurethane resin and then carrying out a drying method

to form a microporous coated film, said layer can be used as an adhesive agent layer or as a waterproof layer which also confers moisture permeability.

Next, the present utility model is further explained by means of examples.

Example 1

As the adhesive agent layer, a resin solution of the following formulation was applied using a doctor blade, at a coverage of 5 g/m^2 (by conversion to solids content) to the undersurface of a dyed material comprising a 210 yarn nylon taffeta (warp and weft both 70 denier nylon yarns) obtained in the usual way, after which drying was carried out for 3 minutes at 100°C.

Criscoat P1019 (polyacrylate ester resin solution, produced by Dainippon Ink Kogyo	100 parts
Criscoat NX (isocyanate crosslinking agent, produced by Dainippon Ink Kogyo	1 part

As a waterproof layer, there was applied, on the surface of the adhesive agent layer obtained, a resin solution of the following formulation at a coverage of 22 g/m^2 (by conversion to solids content) using a doctor blade, and then drying was carried out under the same conditions.

Leathermin 3612 (polyurethane resin, produced by Dainichi Seika Kogyo)	100 parts
Aluminium Paste M1100 (aluminium paste, produced by Toyo Aluminium Co.)	10 parts

Then, on the surface of the waterproof layer thus obtained, there was applied a vinyl chloride paste of the following formulation by means of a 50 mesh gravure roll and drying carried out for 3 minutes at 100°C, after which a heat treatment was conducted for 2 minutes at 170°C, to obtain a layer of projections/indentations where the height of the projections was 0.15 mm and the printed area was 11%.

Sumilit PX-NL (vinyl chloride paste resin, produced by Sumitomo Chemical Co.)	100 parts
DOP (plasticizer)	60 parts
mixed terpene	10 parts
dibasic phosphite	2 parts
calcium carbonate	20 parts

Next, immersion was performed in a waterproofing agent of the following formulation, after which the material was squeezed-out to a 40% pick-up and dried, to obtain a waterproof material of outstanding apparel characteristics having projections/indentations at the undersurface of the fabric.

Asahiguard AG730 (a fluorine-based waterproofing agent, made by Asahi Glass)	5 parts
water	95 parts

Example 2

After applying an adhesive layer of the following formulation with a doctor blade at a coverage of 6 g/m^2 (by conversion to solids component) to a dyed material identical to that in Example 1, the material was

immersed in a water bath for 10 minutes at 20°C, then mangled and dried.

Crisbon 8006HV (polyurethane resin, produced by Dainippon Ink Kogyo Co.)	100 parts
Barnock BL-50 (isocyanate crosslinking agent, produced by Dainippon Ink Kogyo)	2 parts

Next, as a waterproof layer, a resin solution of the following formulation was applied by means of a doctor blade at a coverage of 27 g/m^2 (by conversion to solids content) onto the surface of the adhesive agent layer thus obtained, then immersion performed for 10 minutes in a water bath at 20°C, after which further immersion was carried out for 20 minutes in a hot water bath at 60°C to extract the dimethylformamide remaining in the resin layer, and then mangling and drying were carried out.

A foam vinyl chloride paste of the following formulation was applied onto the surface of the waterproof layer obtained, using a 50 mesh gravure roll, and then drying carried out for 3 minutes at 100°C, after which heat treatment was carried out for 2 minutes at 170°C, to obtain a layer of projections/indentations in which the height of the protruding regions was 0.2 mm and the printed area was 11%.

Sumilit PX-NL (vinyl chloride paste resin, made by Sumitomo Chemical Ind.)	100 parts
DOP	60 parts
mineral terpene	10 parts
dibasic phosphite	2 parts

calcium carbonate 20 parts

Unicel ND (foaming agent, made by Ohtsuka Yakuhin) 5 parts

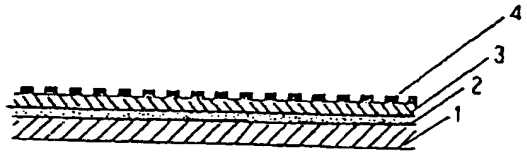
Immersion was then performed in an identical waterproofing agent to that in Example 1, after which the fabric was squeezed out to a 40% pick-up and dried, and there was obtained a waterproof material of outstanding apparel characteristics having projections/indentations on the fabric undersurface.

When the moisture permeation was measured in accordance with the method in JIS K-0208, it was found to be 4300 g/m^2, so there was excellent moisture permeability.

Brief Explanation of the Drawing

The figure is a magnified cross-sectional view showing an embodiment of the present utility model.

1 … base material, 2 … adhesive layer, 3 … waterproof layer, 4 … layer of projections/indentations



⑲日本国特許庁(JP)　⑪実用新案出願公告

⑫実用新案公報(Y2)　平5－33335

⑤Int.Cl.⁵	識別記号	庁内整理番号	㉔㊹公告　平成5年(1993)8月25日
B 32 B 27/12		7258－4F	
3/14		7016－4F	
27/30	101	8115－4F	

(全3頁)

㊹考案の名称　着用性にすぐれた防水布

㉑実　願　昭62－63407　㊺公　開　昭63－170224
㉒出　願　昭62(1987)4月28日　㊸昭63(1988)11月7日

㉒考案者　石丸　信也　福井県福井市上北野町方160
㉑出願人　セーレン株式会社　福井県福井市毛矢1丁目10番1号
㉔代理人　弁理士　斉藤　武彦　外1名
審査官　小林　正巳

1

㊼実用新案登録請求の範囲

1　布帛の表面に接着剤層を介してポリウレタン系樹脂からなる防水層を設け、更に該防水層の表面に高さが0.03～0.3㎜且つ印刷面積が50%以下の塩化ビニル樹脂の不連続な凹凸層を設けてなる着用性にすぐれた防水布。

2　接着剤層がポリアクリル酸系樹脂接着剤又はポリウレタン系樹脂接着剤からなる実用新案登録請求の範囲第1項記載の防水布。

3　防水層のポリウレタン系樹脂がアミノ酸変性ポリウレタン系樹脂である実用新案登録請求の範囲第1項又は第2項記載の防水布。

4　接着剤層及び防水層が透湿性である実用新案登録請求の範囲第1項～第3項のいずれか1項に記載の防水布。

考案の詳細な説明

本考案は防水布に関するものであり、詳しくは皮膚に接触する面が凹凸状で透湿性を有する着用性にすぐれた防水布に関するものである。

現在通常使用されている防水布は基布の裏面にポリアクリル酸エステル系樹脂、ポリウレタン系樹脂、ポリエチレン系樹脂、クロロプレン系樹脂、ポリ塩化ビニル系樹脂等でコーテイングされてなるものが主体であり、該防水布を使用して衣服等に縫製の際には高級品にあつては裏地をつけているが、一般品はコーテイング面を露出したままの状態であるのが普通である。

しかしながら、後者の場合着用時の発汗作用に

2

よるムレや結露状態が顕著で不快感を与えるため、近年は透湿性を有する防水布の開発によりこれらの欠点を改善する試みがなされ実用化されているが、軽い運動の場合には一応の効果があるが、激しい運動の場合には発汗量が多いために特に汗がコーテイングされた樹脂面に大量に結露し防水衣を脱ぐ際に濡れた樹脂面と皮膚とが接触して極度の不快感を与えるという欠点を有しており、これらの問題点を改良した快適な防水布が要望されていた。

本考案の目的は汗の結露したコーテイング面に皮膚が接触しても不快感を与えない効果を有する防水布を提供することにある。

本考案者らは上述したような防水布の欠点を改良すべく鋭意検討した結果、効果の顕著な本考案に到達した。

即ち本考案は布帛の表面に接着剤層を介してポリウレタン系樹脂からなる防水層を設け、更に該防水層の表面に高さが0.03～0.3㎜且つ印刷面積が50%以下の塩化ビニル樹脂の不連続な凹凸層を設けてなる着用性にすぐれた防水布にある。

以下、本考案の防水布を添付図面により説明する。

第1図は本考案の防水布の一例を示したもので、1は合成繊維や他の繊維を混紡した編、織物等の布帛であり、該布帛の裏面に接着剤層2を介して防水層3を設け、更に該防水層の表面に凹凸層4を順次形成してなるものである。

3

該接着剤層2は、ポリアクリル酸エステル系樹脂やポリウレタン系樹脂を塗布することにより得られるが、基布1と防水層3の中間にあつてこれら両者の接着性を向上させるものである。該防水層3はポリウレタン系樹脂（アミノ酸変性ポリウレタン系樹脂等を含む）に各種の着色剤や充填剤等を添加したもので外部から侵入する水を防止するものである。

以上の構成からなる防水布は知られており、そこで用いる防水層となるポリウレタン系樹脂の化学組成等は適宜積層タイプのポリウレタン樹脂系防水布に用いられているものから選択使用できる。具体例としてはポリウレタン樹脂やアミノ酸変性ポリウレタン樹脂をジメチルホルムアミドに溶解した樹脂溶液を用いて基布に塗布後、ジメチルホルムアミドを水に抽出させて微多孔質被膜を形成させたものやポリウレタン樹脂のエマルジョン液を用いて乾式法により、微多孔質被膜を形成させたものも透湿性を与える接着剤層および防水層として使用できる。

本考案では上記の如く接着積層したポリウレタン系樹脂層の上にポリ塩化ビニル樹脂を高さ0.03～0.3㎜、印刷面積50％以下の不連続な形態の凹凸層4として付着させた点に特徴を有する。この凹凸層はグラビア印刷等の印刷によつて形成させることが望ましいが、窒素ガス等を放出する発泡剤を混合させた塩化ビニル樹脂を塗布し加熱発泡させる方法等も本考案にいう高さと印刷面積を満足する限り利用し得る。

該ポリ塩化ビニル系樹脂としてはポリ塩化ビニルのパウダーを可塑剤に分散させたいわゆるペーストレジンが好適であるがミネラルターペンを加えたオルガノゾルなども使用できる。

また、該凹凸層4の印刷面積が大または凸部の高さが低い場合には凹凸層を構成する樹脂面積が平面的になり得られる効果も極度に低下することになるので本考案の目的から外れることになる。かかる観点から印刷面積は50％以下、望ましくは5～20％がよく、凸部の高さも0.05～0.3㎜、望ましくは0.1～0.2㎜が好適である。

塩化ビニル樹脂は上記の如く凹凸層としてポリウレタン系樹脂防水層上に設けることにより防水布本来の機能を具備した上、着用性や耐久性にすぐれるという効果を示すのである。

4

従つて印刷面積は50％以下、望ましくは5～20％がよく、凸部の高さも0.05～0.3㎜、望ましくは0.1～0.2㎜が好適である。

なお前記の接着剤層や防水層にはポリウレタン系樹脂やアミノ酸変性ポリウレタン樹脂をジメチルホルムアミドに溶解した樹脂溶液を用いて基布に塗布後、ジメチルホルムアミドを水に抽出させて微多孔質被膜を形成させたものやポリウレタン樹脂のエマルジョン液を用いて乾式法により、微多孔質被膜を形成させたものも透湿性を与える接着剤層および防水層として使用できる。

以下、実施例により本考案を更に説明する。

実施例　1

通常の方法で得られた210本ナイロンタフタ（経糸及び緯糸共に70デニールナイロン糸）の染色布の裏面に接着剤層として下記処方の樹脂溶液をドクターにて5g／㎡（固形分換算）塗布して100℃×3分間乾燥した。

クリスコートP1019(ポリアクリル酸エステル樹脂溶液、大日本インキ工業㈱製)	100部
クリスボンNX(イソシアネート架橋剤、大日本インキ工業㈱製)	1部

次に得られた接着剤層の表面に防水層として下記処方の樹脂溶液をドクターにて22g／㎡（固形分換算）塗布し、同様の条件で乾燥した。

レザミン3612(ポリウレタン樹脂、大日精化工業㈱製)	100部
アルミペーストM1100(アルミニウムペースト、東洋アルミ㈱製)	10部

更に得られた防水層の表面に下記処方からなる塩化ビニルペーストを50メッシュのグラビアロールにて塗布し100℃×3min乾燥した後、170℃×2分間熱処理し凸部の高さが0.15㎜、印刷面積が11％の凹凸層を得た。

スミリットPX−NL(塩化ビニルペーストレジン、住友化学工業㈱製)	100部
DOP(可塑剤)	60部
ミネラルターペン	10部
二塩基性亜リン酸塩	2部
炭酸カルシウム	20部

次に下記処方の撥水剤に浸漬した後40％のピックアップで絞つて乾燥し、布帛裏面に凹凸のある着用性にすぐれた防水布を得た。

アサヒガードAG730(フッ素系撥水剤、旭硝子

5

(株製)　5部
水　95部

実施例　2

実施例1と同様の染色布の下記処方の接着層をドクターにて6g／m²（固形分換算）塗布した後、20℃の水浴に10分間浸漬しマングルにて絞り、乾燥した。

クリスボン8006HV(ポリウレタン樹脂、大日本インキ工業(株製)　100部
バーノックBL−50(イソシアネート架橋剤、大日本インキ工業(株製)　2部

次に得られた接着剤層の表面に防水層として下記処方の樹脂溶液をドクターにて27g／m²（固形分換算）塗布した後、20℃の水浴に10分間浸漬し、更に樹脂層に残留しているジメチルホルムアミドを抽出するために60℃の温水浴に20分間浸漬処理後マングルにて絞り、乾燥した。

更に得られた防水層の表面に下記処方からなる発泡塩化ビニルペーストを50メッシュのグラビアロールにて塗布し100℃×3分間乾燥した後、170

6

℃×2分間熱処理し凸部の高さが0.2㎜、印刷面積が11%の凹凸層が得られた。

スミリットPX−NL(塩化ビニルペーストレジン、住友化学工業(株製)　100部
DOP　60部
ミネラルターペン　10部
二塩基性亜リン酸塩　2部
炭酸カルシウム　20部
ユニセルND(発泡剤、大塚薬品(株製)　5部

次に実施例1と同様の撥水剤に浸漬した後、40%のピックアップで絞つて乾燥し、布帛裏面に凹凸のある着用性に優れた防水布を得た。

透湿度をJIS K−0208法により測定したところ4300g／m²24hrs.であり良好透湿性を有するものであつた。

図面の簡単な説明

図は本考案の一実施例を示す拡大断面図である。

1……基布、2……接着層、3……防水層、4……凹凸層。